NOTES ON THE CODEX TROANO, AND MAYA CHRONOLOGY.

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THE investigations of Professor Thomas, published in the AMERICAN NATURALIST for August, go far towards dispelling the obscurity which has hitherto rested on this interesting document. In examining its pages some other suggestions have occurred to me which may throw further light on its object and contents.

One question in reference to it is, as to what precise period of time it refers. Up to the present there has been no opinion expressed upon this point, but I think it can be approximately if not definitely determined.

To do so we must decide what was the length of an Ahau. It is true that all the old authors, Landa, Cogolludo, Beltran, Lizana and the Maya chronicler, speak of it as a period of twenty years; and the most recent writer on the subject, Dr. Valentini,[1] insists on this being the proper length. On the other hand, we have the profound Maya scholar, Señor Juan Pio Perez, who very positively maintained that it embraced twenty-four years, only twenty of which, however, were counted, the remaining four being considered "intercalary, and, as it were, non-existent." Although no reason whatever for this odd arrangement has been proffered, I am convinced that Perez is correct, and in addition to the valuable corroborative testimony adduced by Professor Thomas, I shall bring forward a calculation which some time ago dispelled any doubts I had on the subject.

As the Kin Katuns, or periods of 52 years, recurred so frequently that after a few generations they could not be distinguished one from the other, and would thus have led to great confusion in chronology, the Ahau Katun was devised, embracing the much longer period of 312 years, and to it was referred any important event in history. Instead of its purpose being "further to complicate the calendar and to deceive the people," as Professor Thomas thinks, it is, when properly used, an extremely simple and easy means of keeping the run of the years, and converting the one computation into the other. For this purpose the series of numbers was used which has been such a mystery to antiquaries: 13, 11, 9, 7, 5, 3, 1, 12, 10, 8, 6, 4, 2.

[1] "The Katuns of Maya History," 1880.

Gallatin explained them as the numerical characters of the days "Ahau" following the first day of each year called Cauac;[1] Dr. Valentini thinks they refer to the numbers of the various idols worshiped in the different Ahaus; Professor Thomas that they are the number of the year (in the indiction of 52 years) on which the Ahau begins. Each of these statements is true in itself, but each fails to show any practical use of the series; and of the last mentioned it is to be observed that the objection applies to it that at the commencement of an Ahau Katun the numbers would run 1, 12, 10, 8, etc., whereas we know positively that the numbers of the Ahaus began with 13 and continued 11, 9, 7, 5, etc.

The explanation which I offer, is, that the number of the Ahau was taken from the last day Cauac preceding the Kan with which the first year of each Ahau began—for, as 24 is divisible by 4, the first year of each Ahau necessarily began with the day Kan. This number was the "ruling number" of the Ahau, and not for any mystical or ceremonial purpose, but for the practical one of at once and easily converting any year designated in the Ahau into its equivalent in the current Kin Katun, or 52 year cycle. All that is necessary to do this is to *add the number of the year in the Ahau to the number of the year Cauac corresponding to this "ruling number." When the sum exceeds 52, subtract that number.*

Take an example: To what year in the Kin Katun does 10 Ahau XI (the 10th year of the 11th Ahau) correspond?

On referring to a table, or, as the Mayas did, to a "Katun wheel," we find the 11th Cauac to be the 24th year of the cycle; add ten to this and we have 34 as the number of the year in the cycle to which 10 Ahau XI corresponds. The great simplicity and convenience of this will be evident without further discussion.

I now pass to the important question: Can we establish a correct correspondence between the Kin Katuns and the Ahau Katuns with the years of the Christian era?

The attempt has been made with widely divergent results. Perez makes the 13th Ahau begin in 1488, and Gallatin follows him; Valentini has it begin in 1522, but he makes the serious error of supposing the 13th was the *last* Ahau, whereas it was

[1] Trans. Am. Ethnol. Soc., Vol. I, p. 109.

the *first* in the Ahau Katun; besides attributing only twenty years to the Ahau. That both these suppositions are erroneous, will appear by an analysis of a date which has been given us by a Maya writer preserved by Perez and referred to by Professor Thomas. This date is that of the death of Ahpula. A false translation of this important quotation, led Gallatin to suspect an error in the original; but it is entirely correct and intelligible as it stands. The text runs thus:

"In the 13th Ahau Chief Ahpula died. Six years were wanting to complete the 13th Ahau. This year was counted towards the east of the wheel, and began on the 4th Kan. Ahpula died on the 18th day of the month Zip, on the 9th Imix; and that it may be known in numbers it was the year 1536."

Side by side to this must be put a very precise date given by Bishop Landa, and corroborated by native writers. It is to the effect that "the Spaniards arrived at the city of Merida in the year of the nativity of our Lord 1541, which, said the Indians, was precisely in the first year of the period of Eleven Ahau."

Here, then, are two dates which should be reconciled. It looks difficult, at first sight. Counting six years back from 1541, brings us to 1535, not 1536, and Valentini therefore supposes that the Maya chronicler had in view the official incorporation of Merida (Jan. 6, 1542)—though what that would have had to do with the fixed principles of Maya chronology, he does not make clear.

In reality, there is no contradiction at all. The Maya year did not begin January 1 as does ours, *but July 16*, at or about the time of the transit of the sun by the zenith in the latitude of Merida. Hence the Maya chronicler identified the 6th year from the end of the Ahau with 1536, because the greater part and the latter part of that Ahau year was actually in A. D. 1536. In point of fact, Chief Ahpula, whoever he was, died Sept. 11, 1535, O. S.

Having fixed this date beyond peradventure, I shall take another step. The Ahau Katun of 312 years, divided into 13 periods of 24 years each, embraces 6 Kin Katuns of 52 years each; yet owing to the properties of the different numbers, the first year of any Ahau will not coincide with the first year of any Kin Katun except at the beginning of the Ahau Katun; and from the date of this coincidence the Ahaus were reckoned *beginning with the 13th* (as Perez positively and correctly states).

Referring again to Chief Ahpula's death, the chronicler states

that it occurred not only in the 6th year from the close of the Ahau, but he also gives it in the Kin Katun reckoning as the year 4 Kan. Now it is obvious that if Ahau XIII is the first of the greater cycle, the number of the year referred to should be the same as the number of the year 4 Kan in the lesser cycle—a coincidence which could not occur except in the first Ahau of the Katun. In fact, 4 Kan is the 18th year of the Kin Katun; and of course $24 - 6 = 18$, the year of the Ahau.

This leads to the result that the coincidence above referred to, which marked the beginning of the greater cycle, occurred July 16, 1517, on which day, for the first time for 312 years, the current Ahau and Kin Katun both began on the day 1 Kan.

With this date thus definitely fixed, it would be easy to construct a table showing the correspondences of the Maya and Christian systems of reckoning. I shall pass, however, to its application to the Codex Troano.

Leaving aside the opinion of the Abbé Brasseur that this manuscript is a sort of geological treatise, and that of Mr. Bollaert that it is a history, all unprejudiced students have agreed that a portion of it at least is a calendar—what the Mayas called *tzolan Katun*, the arrangement of the Katuns or divisions of time, and probably also a *tzolanté*, ritual. The left hand columns of the four plates numbered XXIII, XXII, XXI, XX, as has been noted by Professor Thomas, enumerate a series of 52 years beginning with 10 Cauac, which is the 36th year of the Kin Katun. Could we find anywhere on these plates the number of the Ahau, there would be no difficulty in fixing the exact date of the manuscript. I have no doubt that Professor Thomas is right in believing that the Ahau is indicated in the upper compartment of Plate XXIII; and I had repeatedly sought to make it out there before seeing his article; but unless it is the figure two in red at the top of the column of numbers to the right of the figures in blue, I cannot discern it. Assuming that the date is Ahau 11, and the year 10 Cauac, it is obvious from the method of calculating above given that the year with which this calendar begins is that which corresponds to July 16, 1500–1501, and that it ends on the year 9 Ix, Ahau XI—July 16, 1552–1553.

Passing by various other considerations of interest in connection with the Codex, I shall offer one suggestion which, so far as I know, has not heretofore been made.

It is known to all students of the subject that there is no account of the plan adopted by the Mayas to arrange their intercalary days. That they did allow for these days is asserted by all authorities; if they had not done so, they would, as Gallatin observes, have been out of their reckoning twenty days every eighty years; whereas we know that they were only forty-eight hours astray in the time of the transit of the sun by the zenith at the time of the Conquest (Pio Perez).

Their method of intercalating is, I believe, illustrated by the Codex Troano. One of the most instructive pages of that manuscript, is the title page. Were it fully deciphered, we should doubtless have a key to the whole work. It is composed of eleven lines across the page, each presenting either seven numbers or seven figures. The first row from the top of the page is partly erased, but may readily be restored.[1] It represents the hieratic signs of the seven days:

Ymix, Ix, Akbal, Kan, Chicchan, Cimi, Manik.

Below them stand the numbers:

1, 2, 3, 4, 5, 6, 7.

Now of these days, the first three named—Ymix, Ix, Akbal—are the *last* of the series of 20 which make up the Maya month, while the remaining four are in their order, the *first* of the month.

This serves to identify the kind of book the Codex is, for Landa has, among his other obscurities about the Maya calendar, this particularly obscure passage:

"It is curious to note how the dominical letter [of the year] always comes up at the beginning of its year, without mistake or failing, and that none of the other twenty letters appears. They also used this method of counting in order to derive from certain letters a method of counting their epochs and other things, which, though interesting to them, does not concern us much here. It is enough to say that the character or letter with which they begin their computation of the days or their calendar is called *One Ymix* which is this | Sign of day. | which has no certain nor fixed day in which it falls. Because each one changes its

[1] The reasoning of Professor De Rosny on this point is conclusive. See his "Essai sur le Déchiffrement de l'Ecriture Hiératique de l'Amérique Centrale." Folio, Paris, 1876, p. 26.

position according to his own count; yet for all that, the dominical letter of the year which follows does not fail to come up correctly."[1]

This certainly is not to be understood, as has been supposed by M. de Charencey, who has made some excellent studies on this Codex, to mean that the year began with the day Ymix.[2] The contrary is distinctly affirmed by Landa. The true explanation I take to be the following:

Each period of 13 years began with the day 1 Kan, and, counting 365 days to the year, ended on the day 13 Cauac. In each period there should be three intercalary days, every fourth year being properly a leap year. These three days are allowed for by beginning the next subsequent 13 year period, not on the day following 13 Cauac in regular order, but by starting the almanac of the period with Ymix, thus allowing three days to elapse, which would bring 1 Kan of the new year in its proper astronomical position within about half an hour.

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EDITORS' TABLE.

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—— It is refreshing to the ordinary plodding scientific mind, trammeled by the clogs and chains of the inductive method, to read the addresses of some (by no means the majority) of the metaphysicians of the Concord Summer School of Philosophy. Aiming his *a priori* gun at the human soul, Dr. Jones brings it down at the first shot, stuffs it with the Platonic philosophy, and finds, after all, that "the soul exists only as *objectivation*, manifesting itself out of itself." We on the whole prefer this to the degrading conception of the materialists and nescientists who are said to teach that the soul is a function of the brain, as it is really a definition we can understand. We quoted Carlyle's opinion of evolution in a recent number; here is Dr. Jones' deliberate characterization of the evolution theory, doubtless the result of years of scientific research and philosophic induction: "Of the idea of evolution and of the origin of the species, we must think some worthier thought than that of a monkey or gorilla rubbing off his tail and otherwise improving his condition, until, through natural

[1] "Relacion de las Cosas de Yucatan," p. 236.

[2] "Recherches sur le Codex Troano," p. 10, 1876.